

**COPY**

PATENT  
PD-10981971-4

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Confirmation No.: 7781

JAMES R. HEATH ET AL

Serial No.: 09/907,314

Group Art Unit: 2826

Filed: July 17, 2001

Examiner: A. N. Sefer

For: CHEMICALLY SYNTHESIZED AND ASSEMBLED  
ELECTRONIC DEVICES

---

Assistant Commissioner of Patents  
Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Sir:

This is a Preliminary Amendment in the above-identified patent application. Please amend the application as follows:

**IN THE SPECIFICATION:**

Please replace the paragraph beginning at page 1, line 15 with the following rewritten paragraph:

--The present application is related to the following applications/patents: Serial Numbers 09/280,225, now U.S. Patent No. 6,314,019, issued November 6, 2001 ("Molecular Wire Crossbar Interconnects for Signal Routing and Communications"); 09/280,189, now U.S. Patent No. 6,128,214, issued October 3, 2000 ("Molecular Wire Crossbar Memory"); 09/282,045 ("Molecular Wire Crossbar Logic"); 09/282,049, now U.S. Patent No. 6,256,767, issued July 3, 2001 ("Demultiplexer for a Molecular Wire Crossbar Network (MWCN Demux)"); and 09/280,188 ("Molecular Wire Transistors"), all filed on even date herewith. The present application is the foundational application, upon which the related applications depend for

cation is the foundational application, upon which the related applications depend for construction of the various devices and apparati disclosed and claimed therein.--

Please replace the paragraph beginning at page 20, line 19 with the following rewritten paragraph:

--The technology disclosed and claimed herein for forming crossed wires (micrometer or nanometer) may be used to perform a variety of functions and to form a variety of useful devices and circuits for implementing computing on a microscale and even on a nanoscale. Molecular wire crossbar interconnects (MWCI) for signal routing and communications are disclosed and claimed in related application Serial No. 09/280,225 (U.S. Patent 6,314,019); molecular wire crossbar memory is disclosed and claimed in related application Serial No. 09/280,189 (U.S. Patent 6,128,214); molecular wire crossbar logic (MWCL) employing programmable logic arrays is disclosed and claimed in related application Serial No. 09/282,045; a demultiplexer for a MWC network is disclosed and claimed in related application Serial No. 09/282,049 (U.S. Patent 6,256,767); and molecular wire transistors are disclosed and claimed in related application Serial No. 09/280,188, all filed on even date herewith.--

Please replace the paragraph beginning at page 21, line 1 with the following rewritten paragraph:

--As illustrated in FIG. 7, the switch 10 of the present can be replicated in a two-dimensional array to form a plurality, or array, 60 of switches to form a crossbar switch. FIG. 7 depicts a 6x6 array 60, but the invention is not so limited to the particular number of elements, or switches, in the array. Access to a single point, e.g., 2b, is done by impressing voltage on wires 2 and b to cause a change in the state of the molecular species 18 at the junction thereof, as described above. Details of the operation of the crossbar switch array 60 are further discussed in related application Serial No. 09/280,225 (U.S. Patent 6,314,019).--

#### **IN THE CLAIMS:**

Please add new Claims 38-47 as follows:

--38. (New) The method of Claim 23 wherein said device is irreversibly switchable from a first chemical state to a second chemical state of said bi-stable molecule.--

--39. (New) The method of Claim 23 wherein said device is reversibly switchable between a first chemical state and a second chemical state of said bi-stable molecule.--

--40. (New) The method of Claim 23 wherein said connector species comprises a layer of said bi-stable molecules.--

--41. (New) The method of Claim 40 wherein said layer of said bi-stable molecules has a thickness of a monolayer of said bi-stable molecules.--

--42. (New) The method of Claim 23 wherein said connector species is selected from the group consisting of metallocenes, rotaxanes, pseudo-rotaxanes, and catenanes.--

--43. (New) The method of Claim 34 wherein said device is irreversibly switchable from a first chemical state to a second chemical state of said bi-stable molecule.--

--44. (New) The method of Claim 34 wherein said device is reversibly switchable between a first chemical state and a second chemical state of said bi-stable molecule.--

--45. (New) The method of Claim 34 wherein said connector species comprises a layer of said bi-stable molecules.--

--46. (New) The method of Claim 45 wherein said layer of said bi-stable molecules has a thickness of a monolayer of said bi-stable molecules.--

--47. (New) The method of Claim 34 wherein said connector species is selected from the group consisting of metallocenes, rotaxanes, pseudo-rotaxanes, and catenanes.--

#### REMARKS

Claims 14-47 are in the application. New Claims 38-39 are added to claim irreversible switching and reversible switching, respectively, between two chemical states, as disclosed on

page 3, line 27 to page 4, line 2, page 6, lines 12-15 and page 8, lines 8-15. New Claims 40-41 are directed to the nature of the connector species as a layer of the bi-stable molecules and its thickness; see, e.g., page 4, lines 4-7 ("molecule or layer of molecules at the junction of the two wires") and page 18, lines 3-7 ("single molecular monolayer film 16"). New Claim 42 recites the preferred connector species, as disclosed on page 14, lines 25-28. New Claims 43-47 are analogous to Claims 38-42, respectively.

The specification is amended on pages 1, 20, and 21 to update the status of related applications.

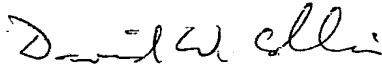
Attached hereto is a marked-up version of the changes made to the specification and claims by the current Amendment. The attached page is captioned "**Version with Markings to Show Changes Made**".

It is understood, based on a telephone discussion between the undersigned and Mr. Nathan J. Flynn, SPE, on August 20, 2002, that the restriction requirement dated April 22, 2002, has been withdrawn having been sent out in error by the PTO.

The foregoing amendments and arguments are submitted to place the application in condition for allowance. The Examiner is respectfully requested to take such action. If the Examiner has any questions, he is invited to contact the undersigned at the below-listed telephone number. HOWEVER, ALL WRITTEN COMMUNICATIONS SHOULD CONTINUE TO BE DIRECTED TO: IP ADMINISTRATION, LEGAL DEPARTMENT, M/S 35, HEWLETT-PACKARD COMPANY, P.O. BOX 272400, FORT COLLINS, CO 80527-2400.

Respectfully submitted,

August 20, 2002

  
\_\_\_\_\_  
David W. Collins  
Reg. No. 26,857  
Attorney for Applicants

75 West Calle de las Tiendas  
Suite 125B  
Green Valley, AZ 85614

Telephone calls may be made to:  
(520) 399-3203

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION:**

The paragraph beginning at line 15 of page 1 has been amended as follows:

The present application is related to the following [applications] applications/patents: Serial Numbers [ ] 09/280,225, now U.S. Patent No. 6,314,019, issued November 6, 2001 ("Molecular Wire Crossbar Interconnects for Signal Routing and Communications") [[PD-10981966-1]]; [ ] 09/280,189, now U.S. Patent No. 6,128,214, issued October 3, 2000 ("Molecular Wire Crossbar Memory") [[PD-10981968-1]]; [ ] 09/282,045 ("Molecular Wire Crossbar Logic") [[PD-10981969-1]]; [ ] 09/282,049, now U.S. Patent No. 6,256,767, issued July 3, 2001 ("Demultiplexer for a Molecular Wire Crossbar Network (MWCN Demux)") [[PD-10981970-1]]; and [ ] 09/280,188 ("Molecular Wire Transistors") [[PD-10981967-1]], all filed on even date herewith. The present application is the foundational application, upon which the related applications depend for construction of the various devices and apparatus disclosed and claimed therein.

The paragraph beginning at line 19 of page 20 has been amended as follows:

The technology disclosed and claimed herein for forming crossed wires (micrometer or nanometer) may be used to perform a variety of functions and to form a variety of useful devices and circuits for implementing computing on a microscale and even on a nanoscale. Molecular wire crossbar interconnects (MWCI) for signal routing and communications are disclosed and claimed in related application Serial No. [ ] [PD-10981966-1] 09/280,225 (U.S. Patent 6,314,019); molecular wire crossbar memory is disclosed and claimed in related application Serial No. [ ] [PD-10981968-1] 09/280,189 (U.S. Patent 6,128,214); molecular wire crossbar logic (MWCL) employing programmable logic arrays is disclosed and claimed in related application Serial No. [ ] [PD-10981969-1] 09/282,045; a demultiplexer for a MWC network is disclosed and claimed in related application Serial No. [ ] [PD-10981970-1] 09/282,049 (U.S. Patent 6,256,767); and molecular wire transistors are disclosed and claimed in related application Serial No. [ ] [PD-10981967-1] 09/280,188, all filed on even date herewith.

The paragraph beginning at line 1 of page 21 has been amended as follows:

As illustrated in FIG. 7, the switch 10 of the present can be replicated in a two-dimensional array to form a plurality, or array, 60 of switches to form a crossbar switch. FIG. 7 depicts a 6x6 array 60, but the invention is not so limited to the particular number of elements, or switches, in the array. Access to a single point, e.g., 2b, is done by impressing voltage on wires 2 and b to cause a change in the state of the molecular species 18 at the junction thereof, as described above. Details of the operation of the crossbar switch array 60 are further discussed in related application Serial No. [\_\_\_\_\_] [PD-10981966-1]] 09/280,225 (U.S. Patent 6,314,019).

#### **IN THE CLAIMS:**

New Claims 38-47 have been added as follows:

--38. (New) The method of Claim 23 wherein said device is irreversibly switchable from a first chemical state to a second chemical state of said bi-stable molecule.--

--39. (New) The method of Claim 23 wherein said device is reversibly switchable between a first chemical state and a second chemical state of said bi-stable molecule.--

--40. (New) The method of Claim 23 wherein said connector species comprises a layer of said bi-stable molecules.--

--41. (New) The method of Claim 40 wherein said layer of said bi-stable molecules has a thickness of a monolayer of said bi-stable molecules.--

--42. (New) The method of Claim 23 wherein said connector species is selected from the group consisting of metallocenes, rotaxanes, pseudo-rotaxanes, and catenanes.--

--43. (New) The method of Claim 34 wherein said device is irreversibly switchable from a first chemical state to a second chemical state of said bi-stable molecule.--

--44. (New) The method of Claim 34 wherein said device is reversibly switchable between a first chemical state and a second chemical state of said bi-stable molecule.--

--45. (New) The method of Claim 34 wherein said connector species comprises a layer of said bi-stable molecules.--

--46. (New) The method of Claim 45 wherein said layer of said bi-stable molecules has a thickness of a monolayer of said bi-stable molecules.--

--47. (New) The method of Claim 34 wherein said connector species is selected from the group consisting of metallocenes, rotaxanes, pseudo-rotaxanes, and catenanes.--